



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

03-ERD-0055

FEB 12 2003

Mr. Rick Gay, Acting Program Manager
Confederated Tribes of the Umatilla Indian Reservation
Environmental Sciences and Technology Program
P.O. Box 638
73239 Confederated Way
Pendleton, Oregon 97801

RECEIVED
MAY 13 2003
EDMC

Dear Mr. Gay:

**116-N-1 TRENCH EXPLANATION OF SIGNIFICANT DIFFERENCE – TRIBAL
COMMENTS TO HANFORD ADVISORY BOARD (HAB) RIVER AND PLATEAU
COORDINATOR MEETING**

Thank you for your letter dated January 15, 2003, to the U.S. Department of Energy, Richland Operations Office (RL), and for your comments received during the Hanford Advisory Board (HAB) River and Plateau Committee meeting held on January 8, 2003. Attached are the responses to your comments.

The HAB Committee requested a thorough presentation and discussion on the 100-N groundwater contamination, as well as the need for further excavation at the 116-N-1 waste sites in the 100-N Area and institutional controls. The objectives of the January 8 presentation were to provide the engineering and hydrogeology foundation for the proposed Explanation of Significant Difference (ESD), and the schedule and public involvement process for the ESD.

A 30-day public comment period on the ESD began on February 3, 2003. EPA and Ecology are supportive of the actions proposed by DOE. DOE contends that the actions proposed at the 116-N-1 waste site remain protective of human health and the environment based on the evaluation contained in the ESD.

We will be contacting you to arrange a workshop to discuss additional questions on the ESD and the associated 100-N groundwater remediation.

Mr. Rick Gay
03-ERD-0055

-2-

FEB 12 2003

If there are any questions, please contact me or your staff may contact Mr. Chris Smith, Environmental Restoration Division, at (509) 372-1544. For further information or assistance specifically concerning 100-N groundwater issues, please contact Mr. K. Michael Thompson, Waste Management Division, at (509) 373-0750.

Sincerely,



Keith A. Klein
Manager

(for)

ERD:DCS

Attachment

cc w/attach:
Gary Burke, CTUIR
Nicholas Ceto, EPA
Shelley Cimon, Oregon
Dennis Faulk, EPA
John Price, Ecology
Michael Wilson, Ecology

Response to Tribal Comments on 116-N-Trench Explanation of Significant Difference

Comment 1. "The Sr-90 contamination is proposed by DOE to have spread out evenly underground and now forms a "pancake" of contamination. However, there is no such thing as a homogeneous geologic environment that would create a "pancake" of contamination. This is especially true for the region near the Columbia River because of the fluvial and lacustrine depositional environment. Nature abhors a homogeneous environment. Water instead has preferred pathways of flow. The contamination in wells appears to show that there may be a minimum of two preferred pathways that have reached the Columbia River since these zones have high levels of contamination."

Response to Comment 1. DOE has not proposed that the "Sr-90 has spread out evenly at the 100-N area. The distribution of strontium-90 (Sr-90) is strongly dependent on the local geology and soil characteristics. The "pancake" analogy utilized in the presentation is a visual diagram intended to portray the vadose zone and soils within the aquifer that is the source of the Sr-90. Nothing in the presentation alluded to the area being uniformly contaminated. Published geologic cross-sections from previous field investigations reveal that there is a lens of contamination in the vadose zone caused by the mounding of the aquifer from Sr-90 laden discharges to the liquid disposal trenches. The conceptual model presented in the January 8, 2003 HAB River and Plateau Committee meeting does not require a homogeneous and/or isotropic geologic environment. DOE did not present anything that indicated there is a uniform distribution of Sr-90 in the subsurface. The position presented by DOE is that the current and future source of Sr-90 in the aquifer is the mass of Sr-90 in the wetted soil matrix of the unconfined aquifer and in the current vadose zone immediately above the aquifer (the area previously wetted by reactor discharges). The soils below the two liquid effluent disposal facilities are not a source of Sr-90 that is predicted to reach the Columbia River. Excavating the soils below the trenches will not appreciably reduce the Sr-90 in the aquifer.

Comment 2: "DOE only investigated three alternatives for cleanup up the sediments below the 116-N trench 1) a large open pit with a 2-to-1 slope walls that would involve workers using bulldozers, 2) an open pit that would cover the ground with a subsurface barrier, and 3) no action. DOE should investigate other technologies to excavate and cleanup the contaminated soils. This includes freeze walls, shoring up excavations, and especially the use of modern remote mining technology such as drag lines. These would preserve surface features, limit the size of the excavation, and pose the least risk to the workers on site."

Response to Comment 2: DOE is conducting soil cleanup of the 100-N Area in accordance with regulatory approved documentation to remove and dispose of soil contamination. Use of existing excavation equipment and practices continue to meet the goals and objectives of the selected remedy. Evaluation of other alternatives have been presented in recent HAB Committee meetings and were discussed in the January 8, 2003, HAB Committee meeting. These alternatives served as a comparison basis in the development of the ESD to the 100-N Area Records of Decision (ROD). Evaluation of other alternatives was provided against the use of the current excavation equipment in the ESD, such that the public would have sufficient information to

compare various factors such as; 1) impacts to human health and the environment, 2) protection of ecological and cultural resources, 3) cost, 4) worker safety, 5) institutional controls, 6) additional sizing of the Environmental Restoration Disposal Facility (ERDF), and 7) long-term monitoring cost. These factors are referred to as the "balancing factors" in the ROD and require evaluation to determine the extent of additional excavation needed in situations where residual contamination exists below the engineered structure and at a depth greater than 4.6 m (15 ft). The ESD is not the regulatory pathway for fundamentally changing the remedy or the venue for evaluating alternate technologies. The balancing factors analysis demonstrates that the use of

institutional controls to prohibit irrigation rather than excavating additional contaminated soil below 4.6 m (15 ft) prevents an additional 11,000 mrem worker exposure to radiation, remains protective of human health and the environment, is cost-effective, does not add additional ERDF cells, and does not negatively impact ecological or cultural resources (e.g., the *Mooli-Mooli*). The balancing factors analysis is also consistent with the reasonably expected future land use identified in the *Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)* (CLUP ROD). The CLUP ROD identifies the 100-N location as a preservation area and also states that it may be necessary to restrict certain activities to prevent the mobilization of contaminants, the most likely example of which is the restriction of activities that discharge water to the soil or involve excavating below 4.6 m (15 ft). Therefore, prohibiting irrigation at the 116-N-1 waste site is consistent with the CLUP ROD. Furthermore, preserving the *Mooli-Mooli* cultural resource is also consistent with the Executive Order for the Hanford Reach National Monument. Based on the evaluation of the balancing factors, use of institutional controls provides the best balance in protecting human health and the environment.

Comment 3: "DOE is proposing to leave all contamination located deeper than 15 feet below the ground surface and allowing it to degrade (or migrate) naturally. CTUIR believes the excavation should continue all the way to the depth of the contaminated soil and even below, to the contaminated ground water, if this site is to be made safe for future generations. Leaving the Sr-90 contamination in place in the vadose zone creates a continuing threat to the environment for hundreds to thousands of years."

Response to Comment 3: Excavation of the soils below the cribs will not result in diminishing the size or concentration of the Sr-90 plume nor will it result in reduction of Sr-90 reaching the accessible environment of the Columbia River and its shoreline. The current and future source of Sr-90 in the aquifer is the mass of Sr-90 in the wetted soil matrix of the unconfined aquifer and in the current vadose zone immediately above the aquifer (the area previously wetted by reactor discharges). Excavation is not a viable alternative for cleaning up the aquifer or reducing the flux of Sr-90 to the Columbia River.

Comment 4: "In DOE's model, they do not account for fluctuations in the Columbia River nor the ground water adjacent to the river having any affect on the mobilization of the Sr-90 contamination. The Columbia River is currently at a relatively low level and has been for the past several years. When the Columbia River rises during a flood event, the ground water will also rise into the contaminated vadose zone. This will remobilize some of the contamination that is currently "locked" up in the soils above the ground water table."

Response to Comment 4: DOE's conceptual and numerical models do include the dynamic river stage. Unfortunately, the technical details of the numerical model were not discussed at the January 8, 2003, HAB Committee meeting. A copy of the numerical model is enclosed.

Comment 5: "DOE states that this area has been thoroughly characterized and does not need any further studies to define the geology, the ground water, nor the state and location of the Sr-90 contamination. CTUIR feels this area has not been thoroughly characterized as indicated by wells that had a very high detect level of Sr-90, now have no detect since the ground water has dropped below the bottom of the well."

Response to Comment 5: The site has been extensively characterized. Numerous characterization borings and groundwater monitoring wells exist, further information was gained during the excavation of the liquid disposal facilities, and seeps along the shoreline have been monitored. Your letter indicates that wells have been left dry "since groundwater has dropped below the bottom of the well." The wells in the 100 Areas are subject to dynamic water levels, reflecting the influence of the highly dynamic fluctuations of the stage of the Columbia River. However, we have not had issues concerning declining water levels as seen in the 200 Areas. There are sufficient groundwater monitoring wells to understand the aquifer and the Sr-90 plume and there are sufficient soil samples from characterization borings and from well drilling to generate geologic cross-sections of the geology and Sr-90 distribution in the soils from which a sound conceptual model can be formulated.

Comment 6: "As was stated in the meeting, DOE feels the Sr-90 that is currently in the ground and in the ground water is totally immobile and poses no threat to the Columbia River. High levels of Sr-90 contamination that exceeds drinking water standards have already been found in near-shore wells and seep-wells in the 100-N area that are discharging to the Columbia River. DOE even stated that some of the Sr-90 is under the Columbia River. This would place the contamination in the hyporheic zone used by many of the invertebrates eaten by the salmonids. CTUIR believes that this contamination is mobile and will continue to be a threat to the environment as long as it is present."

Response to Comment 6: It is not DOE's position, that "the Sr-90 that is currently in the ground and in the groundwater is totally immobile and poses no threat to the Columbia River." There is movement through the vadose zone and in the groundwater, but the rate of movement is slow and the mass flux is small. Our discussions at the HAB Committee meeting specifically stated that our models predict approximately 5 curies of Sr-90 may reach the Columbia River in the next 300 years. To put this release into perspective, it is roughly equivalent to the current

yearly background loading of SR-90 from non-Hanford sources. Current and future human exposure is limited to the shoreline seeps. These seeps, by their physical nature, are not a significant potential drinking water source. It is highly unlikely that anyone would utilize the seeps at a rate that would exceed a four-millirem dose, the dose from which EPA drinking water standards are derived. Environmental monitoring has shown that there is biological uptake of Sr-90 in the riparian habitat, however, the ecological risk is small and below applicable standards.

Comment 7: "DOE would like to only use institutional controls to limit the application of surface water that could drive additional contamination from the vadose zone into the ground water. CTUIR believes that institutional controls can not guarantee that, at any time in the future, irrigation or any other sources of surface water won't be applied on this that will remobilize shallow (but greater than 15 feet) contamination into the ground water. Institutional controls would also limit Tribal access and use of this site."

Response to Comment 7: DOE is conducting soil cleanup of the 100-N Area in accordance with regulatory approved documentation to remove and dispose of soil contamination. Included in the ESD to the 100-N Area Records of Decision (ROD) is an additional institutional control (IC) that prohibits irrigation at the 116-N-1 waste sites. The remaining ICs in the ROD remain intact and are legal requirements for DOE to comply. DOE shall comply with the ICs specified in the ROD; as well as other ICs negotiated in future RODs. Specifically, DOE is required to conduct an annual assessment of the ICs and submit an annual report to EPA and Ecology. Additionally, this ESD requires that DOE submit a report to EPA and Ecology by July 31 of each year, or as required by the *Sitewide Institutional Controls Plan for Hanford CERCLA Response Action*, summarizing the results of the evaluation for the preceding calendar year. At a minimum, the report shall contain an evaluation of whether or not the institutional control requirements continue to be met and a description of any deficiencies discovered and measures taken to correct problems. These commitments by DOE regarding ICs are binding, and will be evaluated and assessed as required. Access to the 116-N-1 waste sites and the 100-N Area remains restricted to protect the public. Future access restrictions are not within the scope of this ESD or ROD.